(1956)

HOWS AND WHYS OF

SERVICE STATION LIGHTING

BY A. L. HART, APPLICATION ENGINEERING, LARGE LAMP DEPARTMENT, NELA PARK

HOWS and WHYS
OF SERVICE STATION LIGHTING

By A. L. HART, Application Engineering, Large Lamp Department, Nela Park

The prime objective of service station lighting is the same as that of any other store lighting: to increase sales, and thereby increase profits for the operator. There are many ways this may be accomplished.

Light attracts a motorist's attention, helps him drive safely from the street to the pump island. It calls attention to the tires, batteries, and accessories (the high profit "TBA" line), and increases the efficiency of all of the service station personnel.

The sign identifies the product, is often the first indication the station exists. It must be competitive in brightness with other areas of brightness nearby. The lighted building front, with its large vertical surfaces, is visible from long distances, and is the primary focal point of attention. Its effectiveness and visibility are increased when poster boards, walls, or fences on either side of the station are lighted.

The pump island should be effectively lighted—it is the point of sale. The station entrances should be seen easily, so a motorist in high speed traffic need not hunt for the break in the curb. The yard area in a highly competitive location needs high levels of illumination over the entire area. In other locations, a "path of light" from entrance to pump island is effective, when the yard is black-topped.

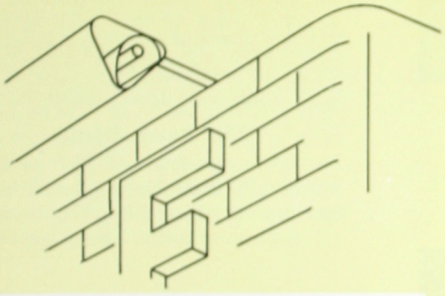
Once the customer is at the pump island, he may be attracted to the sales area inside the building—provided the car is brightly lighted so he feels he can safely leave it, and also provided the merchandise is attractively displayed and well lighted for appraisal. This lighting is also important during daylight hours, when reflections in large windows tend to obscure the interior.

Nor should the lube room be overlooked. Its walls may also be used for product displays, when well lighted. And of equal importance, it increases the attendants' efficiency and lets the customer *see* what is being done to his car, further promoting his confidence.

It should also be obvious that good rest room lighting promotes good will . . . especially among the increasing number of women drivers and families on the highway today.

Now let us see how service station lighting for selling may be accomplished—area by area.

WHITE building reflects light from a fluorescent valance that not only lights walls, but silhouettes letters mounted on valance to identify the product.



Lighting the Building Front

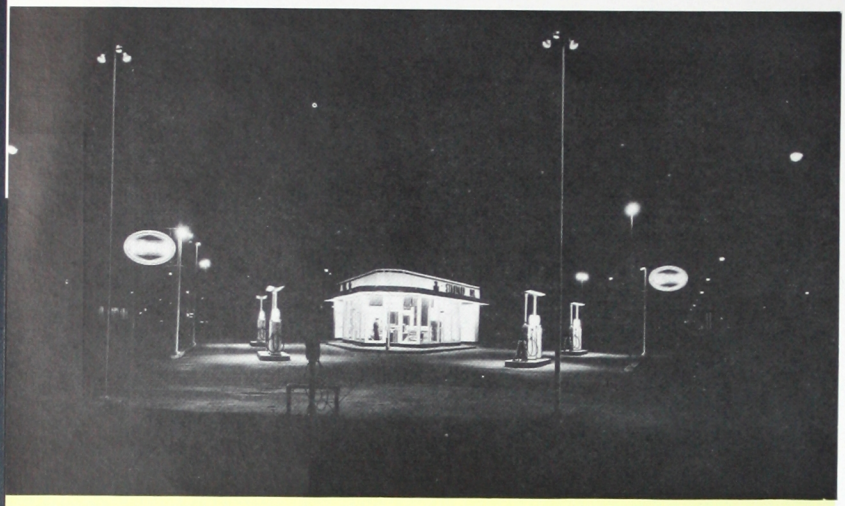
The service station building front should be lighted to levels of 20 to 30 footcandles if the building is white; darker-colored buildings require higher levels of illumination.

In some cases, it is appropriate to mount lighting equipment on the building itself. The principal form of equipment used is the fluorescent valance, or cornice, with two rows of slimline lamps. Polished reflectors increase efficiency, and improve the uniformity of brightness. Glass or plastic covers will help maintain brightness during cold weather. Maintenance of this form of equipment is very important—in order to assure its effectiveness.

Floodlighting equipment mounted on poles at the pump island, or along the station boundary, is another means of lighting the building. On stations with large areas of glass, the light should be concentrated on the area *above* the windows and doors. Narrow beam spotlights are most effective for this purpose. They utilize the light

THE same building, before (above) and after floodlighting wattage was doubled — resulting in quadrupled illumination on the upper surfaces. This is a simple way to meet new competition with higher levels of illumination. PAR-38 floods (5 fc) were changed to PAR-56 medium floods (20 fc).

Service Station Lighting *(continued)*



EXAMPLE of the effect of interior lighting in an essentially glass-front station on a high traffic corner. Two-thirds of the total vertical area seen is lighted from the inside by the general and display lighting systems. A fluorescent valance lights the upper outside walls. The combination of interior and exterior lighting makes the whole building appear luminous, and the large area of brightness attracts the attention of the motorists.

HIGHWAY service station takes advantage of poster panels to extend vertical brightness. Standard methods of sign lighting are used. Yard is lighted by lamps mounted high above pavement. They also serve to attract attention from a distance.

EMBELLISHED bulletins or spectaculars almost dwarf the service station itself, but they serve to advertise the brand name. The low boundary sign is lighted by well-shielded fluorescent lamps. Entrances and yard are lighted to provide easy access.

better, increasing brightness without increasing wattage. Commercial floodlights are appropriate, as are the PAR spot and flood lamps. The 300-watt PAR-56 medium flood is especially suited to the job, because its nearly rectangular beam pattern fits most building shapes. As a result, there is very little "spill" light wasted.

Extending the vertical brightness by means of lighted poster panels, walls, or fences, is another method of increasing the attraction power of the station. Units used may be standard commercial floodlighting units on brackets, supported at the top of the board, fluorescent units like those used on the building itself, or they may be PAR lamps concealed by shrubbery at the base, and protected by a curb or low wall. Footcandle level—about 20.

The Pump Island

Illumination levels of 50 fc or more are usually desirable at pump islands, and can be achieved by using horizontal fluorescent units. These are avail-

FIRST step in vertical brightness . . . lighting upper wall and station name. Lube areas dark.

SECOND step . . . lighting lube and sales rooms. This attracts attention, and promotes confidence.

THIRD step . . . add illuminated poster panels to extend apparent width of site. A level of about 20 fc on white surfaces usually adequate.

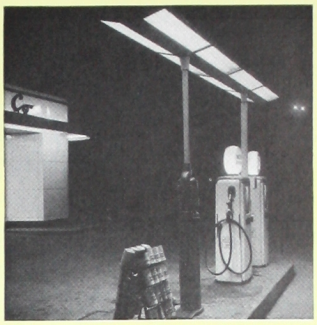
able in unit lengths up to 8 feet, with four or six instant start or slimline lamps in each. Fluorescent units are efficient, providing high lighting levels without objectionable glare. Units with a slight "V" shape provide additional brightness for attraction.

The familiar "mushroom" unit can also be used effectively, if it is properly lamped and well maintained. Filament lamps of 500 to 1000 watts are mounted at heights of 12 to 20 feet; the color-improved mercury lamp, H400-J1 is usually mounted above 14 feet. Color rendition cannot compare with that of fluorescent or filament lighting, and the latter is often used to supplement the mercury, where color is important.

Reflector lamps—300- and 500-watt R-40 floods—will provide illumination levels comparable to those from mushroom units. Two, three, or four lamps at a mounting height of 15 feet or more are used, but they should be aimed not more than 30 degrees from the vertical, to avoid blinding oncoming drivers with glare from the lamps.

PUMP ISLANDS

MUSHROOM unit produces 10 to 20 fc from incandescent lamps of 500 to 1000 w at height of 12 to 20 ft., mercury at 14 ft.



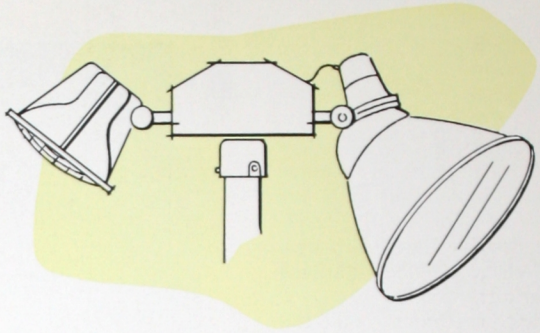
V-SHAPED fluorescent units use four or six lamps per section; two sections joined here to cover island.

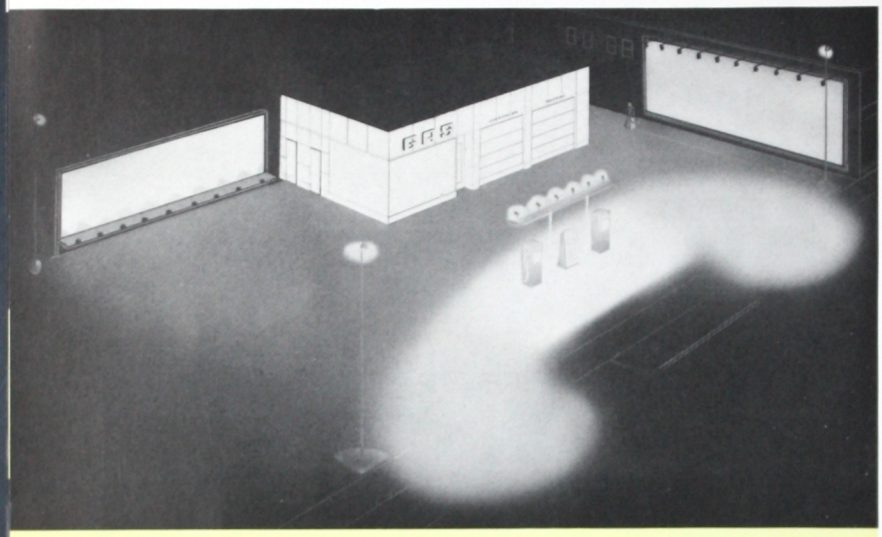
FLAT canopy directs all light toward pumps and pavement. Glass covers help maintain light output of fluorescents at low temperatures.

SERIES of flat fluorescent canopies gives effect of a continuous canopy. Cars are illuminated from both sides. White apron reflects light.

LARGE canopies with fluorescent lamps mounted underneath provide high level, uniform lighting at the pump island. Canopy over sales room protects customers, even in bad weather. This attractive design combines islands with the building, and makes the most of a comparatively small site and good location. Floodlighting also used.

ENTRANCE AND YARD LIGHTING





PATH OF LIGHT produces a brightness pattern on the pavement extending from the entrance drives (about 10 fc) to the pump islands (50 fc) . . . This technique is especially useful on hard-to-light asphalt drives. Lighting equipment is usually 300- and 500-watt R-40 spot lamps, or narrow-beam floodlighting units. Spill light from both of these sources is generally sufficient for the less-used yard areas. Note in the illustration, two methods of extending vertical brightness by spot or floodlighting poster boards at the side of the service station, or a sign on an adjacent building.

Station entrances should be spotlighted to 10 or 15 fc to aid drivers in finding the break in the curb. Narrow-beam equipment, mounted 20 to 24 feet high, is desirable. Two PAR-38 spot lamps, or one PAR-56 flood, will do the job on most entrances.

The yard should have five fc or more. Enclosed floodlights, open floodlights, and reflector lamps are used. Enclosed floodlights with 750- to 1500-watt filament lamps, or 400-watt mercury lamps, are more expensive initially than open units, but light output is more easily maintained. The 300- and 500-watt R-40 floods can be mounted in clusters, and should be carefully aimed.

A rule of thumb for yard lighting calls for 0.15 watts per fc per sq. ft. when filament units are used, or 0.08 watts per fc per sq. ft. when regular mercury lamps are used. Wattage per fc per sq. ft. for fluorescent lighting is about 0.06. Light-colored pavement will help achieve over-all brightness. "Black-top" often requires the "path of light" technique.

UNIFORM yard brightness at this service station is achieved with R-40 flood lamps mounted 24 feet above the yard. Entrances and boundaries are well defined. Light colored pavement reflects more light than dark, achieving a higher brightness for the same lighting level. This is especially desirable in competitive areas; 10 fc.

CONTRAST path of light installation below, with that of uniform brightness, left. Note that the path of light technique covers all essential areas . . . the entrance, pump islands with additional lighting from fluorescent canopies, but leaves the yard and parking area in comparative shadow. This is a high-traffic corner location, but in an apartment neighborhood. Spill light had to be carefully controlled.

FLOODLIGHTING here is accomplished by rapid start, High Output fluorescent lamps, in an enclosed, four-lamp fixture, mounted about 20 feet above base of pump island. Other units at corners of yard. Lighting is comfortable, crisp, clean.

MERCURY lamps, two to a pole, 400 watts each, are supplemented by incandescent bulbs in mushroom units at the pump islands, for better color rendition. Trademark and packaging colors at this station are blue and yellow, accentuated by the mercury color.

LIGHTING **INTERIORS** FOR SALES AND SERVICE

In modern service stations, the office has become a highly profitable store—producing as much as 25 per cent of sales. Good store lighting practice should be followed; general lighting levels of 50 fc or more are desirable.

Lighting fixtures should be well shielded. Luminous, or light-colored, side panels, on fluorescent fixtures parallel to the windows, provide brightness.

Extra lighting for counters and shelves, is usually necessary. A well-designed two-lamp fluorescent valance will deliver an additional 50 to 100 fc to merchandise displayed on shelves.

The valance also provides wall brightnesses that help complete the building-front brightness pattern, and reduce daytime reflections. A third lamp at the top of the valance will build up brightness of upper wall.

Feature displays, high-profit items, and seasonal goods, deserve the additional 100 to 1,000 fc that can be supplied by spotlights. A shadow box or lighted niche with fluorescent lamps, and/or R-30 or PAR-38 lamps, will

LUMINOUS panels with fluorescent lamps above, are extended from the interior clear out to the cornice. By slanting the roof, an attention-getting brightness is obtained, and the sales room with its spotlighted displays is clearly visible from some distance.

A TWO-LAMP fluorescent valance lights wall shelves that invite inspection of packaged items. Window floodlighted.

REMODELED sales room utilizes commercial fluorescent units; swiveled bullet spots and valance lighting on displays.

Service Station Lighting
(continued)

LIGHTING INTERIORS FOR SALES AND SERVICE

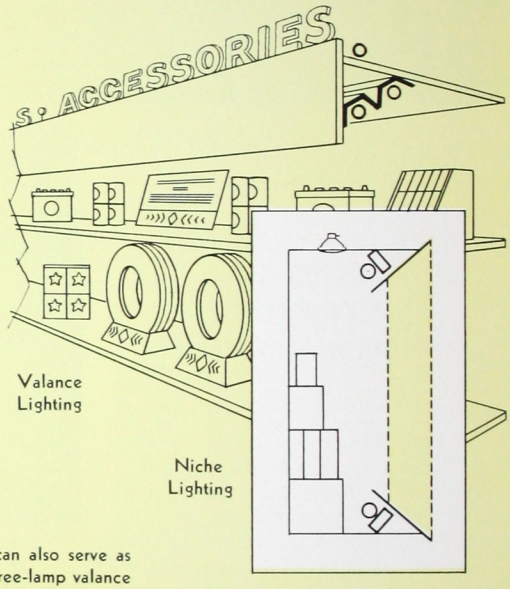
also be an attention-getter to promote impulse buying. Color rendition is important where merchandise is displayed, and de luxe cool white fluorescent is recommended. Standard cool white fluorescent lamps may be used on displays when most of the general illumination comes from filament lamps.

The Lube Room

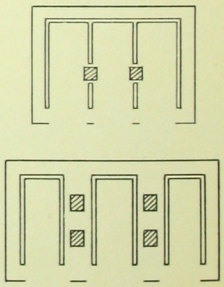
Although lube room lighting is concerned primarily with efficient and comfortable working conditions, side and back wall lighting will prevent it from looking like a black hole from the outside, and will promote customer confidence . . . as well as promote sales.

Fluorescent industrial fixtures with upward light component, arranged in a U-shaped pattern, with a row at both sides of each bay, and a row across the back (see drawings bottom of page), put light on the side of the cars, permit easier seeing under hoods, light walls.

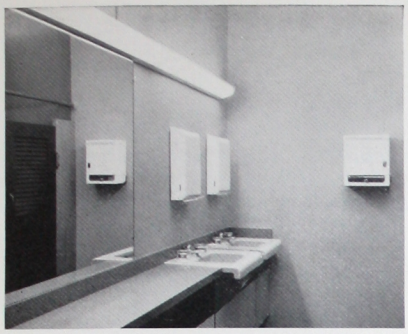
Supplementary lighting mounted under the lift, is described on the facing page. General room illumination should be 50 fc or more.



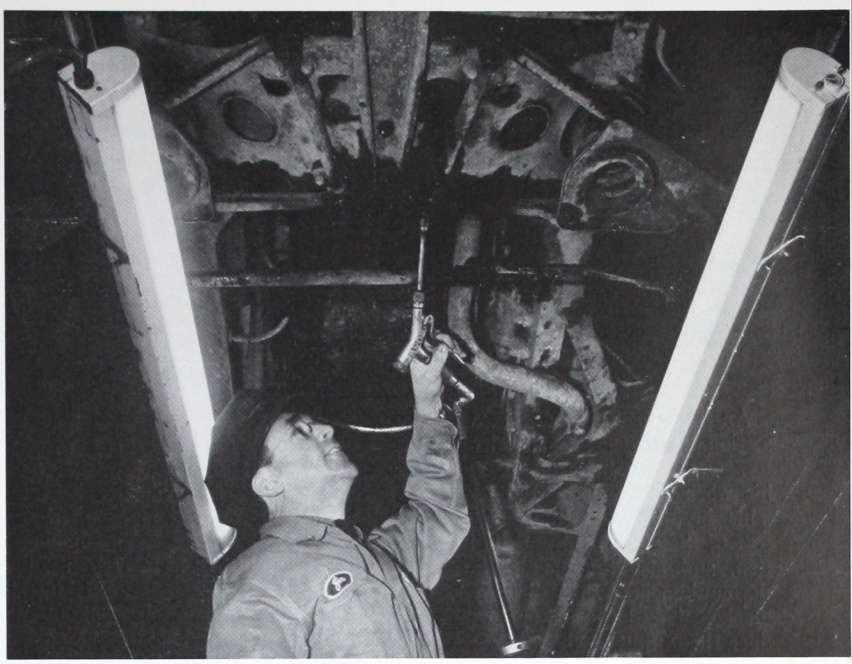
LUBE room with walls of high reflectance and industrial units for general lighting, can also serve as display and impulse sales area. Customers are attracted to high profit TBA line. A three-lamp valance is used, together with a display niche for seasonal items. Sketches at right show construction details.



TYPICAL U-shaped lighting layouts (above) light sides, and under hood of car. Two-lamp units, as pictured at extreme left, provide about 60 fc. New industrial fixture (drawing) improves appearance and comfort, increases the lighting level.

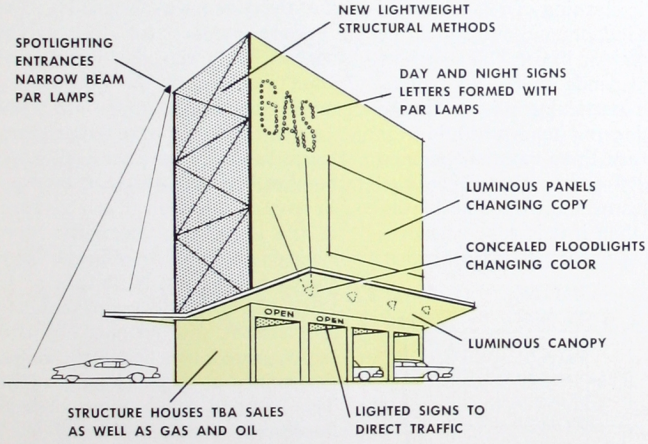


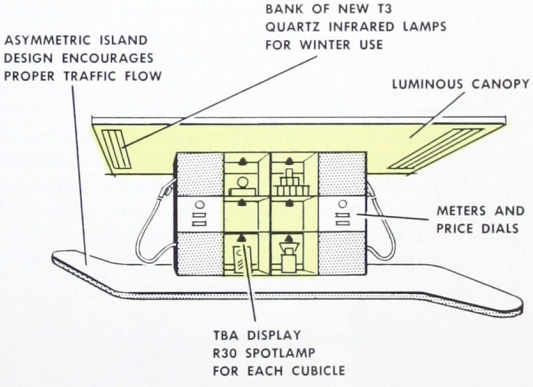
SIMPLE yet attractive rest room facilities are appreciated by public. De luxe fluorescent mirror lighting continues above wash basins. Narrow Textolite shelf resists stains and burns, is mounted above radiator. Tip-out bin for used towels (beneath basins) is space-saving.

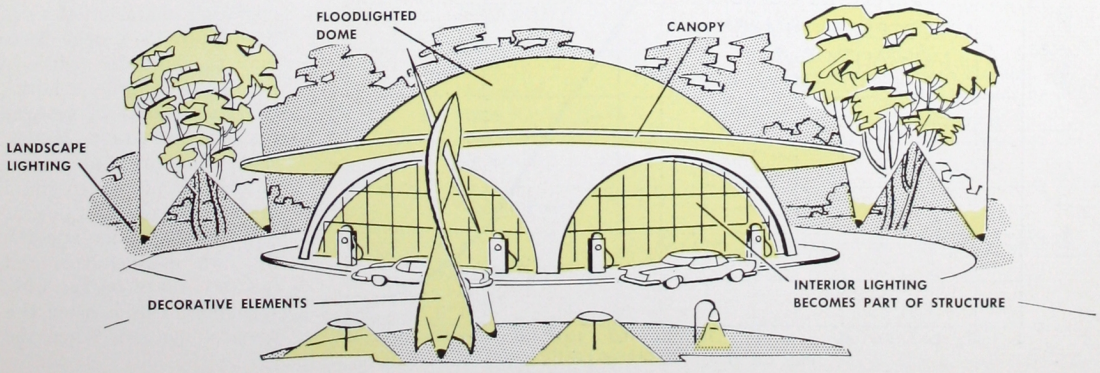


PLASTIC-ENCLOSED fluorescent lamps, mounted on lift, simplify work, improve efficiency. A trouble light is seldom needed. The code requirements usually call for a switching arrangement that will automatically turn off the lamps when the lift is lowered.

SOME IDEAS FOR THE STATION OF THE FUTURE







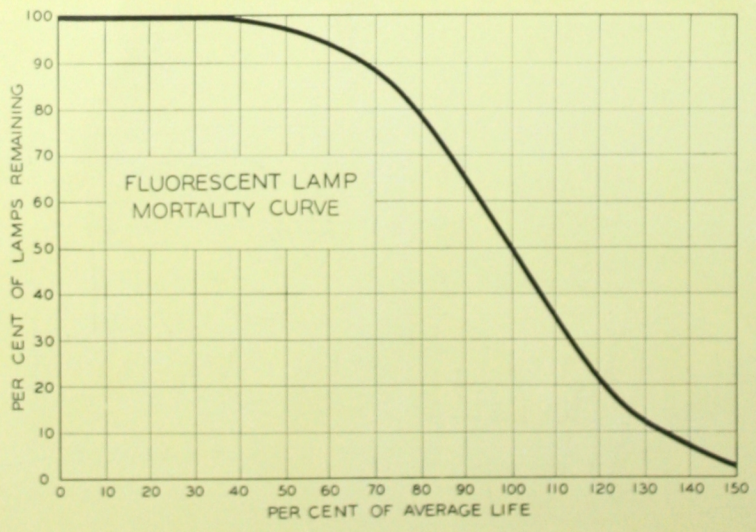
PROTECTING YOUR LIGHTING INVESTMENT

An investment is made in a service station lighting system to attract customers and to help the operator do his work faster and more efficiently. This investment includes the initial cost of the equipment and its installation, and also the operating cost of the equipment. When dirty reflectors, blackened and burned-out lamps reduce the output of the system, a good portion of this investment is lost and cannot be recovered. Also, the advertising effectiveness of the station is reduced, and potential sales may be lost because of poor appearance. To reduce this waste of investment and possible loss of business, a planned maintenance program is recommended.

There are several factors to be considered when planning your lighting maintenance program.

Dirt and dust on lamps and reflectors can often reduce the light that gets out of a floodlight or fixture to less than half its original value, depending on the dirtiness of the atmosphere and the type of units. Open floodlights and fixtures tend to collect dirt and dust faster than enclosed units —must be cleaned more often. PAR and R lamps have self-contained reflectors—cannot collect dirt—need no cleaning. A new reflector is installed each time the lamp is replaced. With interior fluorescent units, the open top such as described earlier allows dust to be carried out of the fixture by rising air currents so that reflectors and lamps stay cleaner longer.

Systematic cleaning of reflectors and lamps, both indoors and out, should be done on a regular basis. The length of the period depends on the dirt conditions at the particular station. Tying down the cleaning to a schedule—for example, every three months for open outdoor units—means that the equipment gets cleaned more often and probably better than if it is done whenever the station operator gets around to it.



Dirt on walls, ceilings, station fronts, etc., also absorbs light and lowers the efficiency of the lighting system. Regular cleaning of all lighted surfaces means more light and more brightness for your lighting dollar.

Lamps continually depreciate in light output as they burn. The earlier blackened lamps are replaced, the higher the maintained illumination will be—without adding to the cost of electrical energy or the number of lighting units used. This means that the station will get full benefit of the light that the system was designed to produce.

Lamp outages rob the station of needed light, mar the overall appearance, and render the lighting equipment useless until lamps are replaced. The average life of a large group of lamps is its rated life. A plot of the number of lamps that can be expected to have burned out at any given point in life is called a mortality curve—a typical curve for fluorescent lamps is shown below, left. Note that at 100% rated life half the lamps have failed and half are still burning. For filament lamps, rated life and light output is determined at specified socket voltages. The life and light output ratings for fluorescent lamps are based on their use with ballasts providing proper operating characteristics. Ballasts that do not provide proper electrical values may substantially reduce either lamp life or light output, or both.

Two methods of systematically replacing burned-out lamps are used: spot relamping and group relamping.

Spot relamping means that lamps are replaced one at a time as they burn out. For the station operator who does his own maintenance, and therefore has no out-of-pocket labor cost for relamping, this is often the most economical method. When the system is

new, there will be few burnouts. Later, as rated life is approached, there will be a rash of burnouts. Still later, after lamps have been replaced a number of times, the rate of burnouts will become constant. If the station system operates 2000 hours a year, and 2000 hour lamps are used (PAR and R lamps for example) the operator can expect to replace all the lamps, one at a time, sometime during the year.

If the station personnel do not replace lamps—if the oil company, a maintenance company, or privately hired labor replaces the lamps—group relamping may be the economical means of keeping the lighting system free of burnouts.

Group relamping is the application of mass production techniques to lighting maintenance. One of the major costs of maintenance is the labor and equipment cost involved in changing a lamp. If more lamps can be changed at one time, this cost can be distributed over a number of lamps and the cost per lamp is reduced. More important, there will be fewer outages to mar the station's appearance, the lighting will be maintained at a higher level, and the lighting system will have a better opportunity to be the sales tool that it was designed for. All of these advantages apply, no matter who does the lighting maintenance.

From the fluorescent mortality curve on the opposite page, it is seen that by the time a new installation has been burned 70% of the rated lamp life, only about 12% of the lamps have burned out. In the next 30% of life, more than ⅓ of the lamps will have to be replaced. After that, the remaining lamps are really living on borrowed time—still using the same amount of energy, but no longer producing light as efficiently as when they were new. If all the lamps in the lighting system were replaced regularly at 70% of life, only 12% of the lamps would have to be replaced individually between relamping periods. In most cases, the extra cost of lamps (a comparatively small item in the total cost of light) is more than offset by a reduction in labor costs.

The length of the group relamping interval usually varies between 50 and 80% of lamp life. The shorter periods become economical with increasing cost of spot relamping—particularly where truck and travel time costs are included. It is also good practice to schedule fixture cleaning at the same time the units are relamped—then relamping costs become almost negligible in the cost picture.

Proper lamps in the proper sockets is another important factor in maintaining the lighting system at peak efficiency. Burned-out lamps should be replaced with lamps of the same wattage and distribution (flood or spot). Filament lamps are marked with the wattage, distribution, and voltage at which they should be burned. In a fluorescent lamp installation, replacement with the right type is essential, and replacement with the right color is desirable from the appearance standpoint. The type and color designation for a fluorescent lamp is marked at one end of the tube. Use this information when reordering lamps. Give your lighting system a chance to work for you—make your investment pay off.

LAMPS FOR SERVICE STATION LIGHTING

Below is a list of ordering abbreviations of the lamps that find widest use in service station lighting. Publications giving engineering data on particular lamp types are available to aid in the design of lighting installations. They are noted under the lamp category. For further information, contact your local G-E lamp supplier or your nearest G-E Lamp Sales District office listed on the back cover. They will welcome your inquiries.

PAR and R LAMPS

150R/SP
150R/FL
300R/3SP*
300R/3FL*
500R/3SP*
500R/3FL*
150PAR/SP*
150PAR/FL*
200PAR/NSP*
200PAR/MFL*
300PAR56/NSP*
300PAR56/MFL*
300PAR56/WFL*
500PAR64/NSP*
500PAR64/MFL*
500PAR64/WFL*

See LS-152 "Projector and Reflector Lamps"

GENERAL SERVICE and FLOODLIGHTING LAMPS

150A
150A/CL
200
200/IF
300
300/IF
500
750
1000
1500
1M/PS52/44*
1500PS52/46*
500T20/50
750T24
1MT24
1M/G40FL
1500G48/6

* *Heat Resistant Glass Bulb*

ROUGH SERVICE

50A/RS
75A21/RS
100A/RS
150A/RS

MERCURY

H400E1
H400-J1
H400E1T*
H400-A1
H1000-C15
H1000-A15

See LS-103 "Mercury Lamps"

FLUORESCENT

Preheat
F20T12
F30T8
F40T12

Instant Start
F40T12/IS

Rapid Start
F40T12/RS

Slimline
F24T12
F36T12
F42T12
F48T12
F64T12
F72T12
F96T12

High Output Rapid Start
F48T12/RS
F72T12/RS
F96T12/RS

See LS-101 "Fluorescent Lamps and Auxiliary Equipments"

Sales District	Street Address	Telephone No.	Manager
ALBANY 7, N.Y.	8 Elk Street	3-4447	J. B. Foley
ATLANTA 3, GA.	187 Spring St., N. W.	CYpress 1526	L. J. Campbell
BALTIMORE 2, MD.	Court Square Bldg.	MUlberry 5-7733	P. M. Wood
BOSTON, MASS. (Newton Upper Falls 64, Mass.)	50 Industrial Place	DEcatur 2-6200	C. M. Snyder
BUFFALO 2, N. Y.	438 Delaware Ave.	GArfield 7381	A. C. Kirchartz
CHARLOTTE 2, N. C.	514 Johnston Bldg.	EDison 4-8614	G. E. Park
CHICAGO 6, ILL.	165 No. Canal St.	DEarborn 2-4712	F. F. Denny
CINCINNATI 2, OHIO	36 East Fourth St.	DUnbar 1-2460	W. S. Hemker
CLEVELAND 14, OHIO	1320 Williamson Bldg.	CHerry 1-1010	G. S. Trotter
DALLAS 19, TEXAS	6500 Cedar Springs Rd.	ELmhurst 3725	R. A. Nungesser
DENVER 2, COLO.	1863 Wazee St.	AMherst 6-0285	J. P. Roger
DETROIT 26, MICH.	1400 Book Tower	WOodward 3-6910	E. A. Anderson
HOUSTON 2, TEXAS	807 C & I Life Bldg.	CApitol 7-4291	T. C. Lauck
INDIANAPOLIS 4, IND.	1115 Circle Tower	MElrose 2-2536	J. R. Colville, Jr.
N. KANSAS CITY 16, MO.	200 E. 16th Ave.	GRand 1-3568	D. M. Warren
LOS ANGELES 5, CALIF.	3450 Wilshire Blvd.	DUnkirk 5-1681	E. C. Herron
MEMPHIS 7, TENN.	1179 Morehead St.	38-1441	G. J. Ellis
MILWAUKEE 3, WIS.	5032 Plankinton Bldg.	BRoadway 1-8580	W. P. Gustafson
MINNEAPOLIS 13, MINN.	500 Stinson Blvd.	STerling 9-7286	G. E. Nelson
NEWARK 2, NEW JERSEY	744 Broad Street, Room 606	MArket 3-3953	K. C. Larabee
NEW HAVEN 10, CONN.	185 Church Street	LOcust 2-9828	E. A. Hawkins
NEW ORLEANS 21, LA.	4800 River Rd.	VErnon 5-6421	G. E. Brown
NEW YORK 22, N. Y.	570 Lexington Ave.	PLaza 1-1311	E. G. Agee
OAKLAND 3, CALIF.	999 — 98th Ave.	LOckhaven 9-3422	D. D. Scarff
PHILADELPHIA 2, PA.	1405 Locust St.	KIngsley 5-3336	W. H. Rademacher
PITTSBURGH 19, PA.	238 W. Carson St.	GRant 1-9050	W. P. Thayer
PORTLAND 10, ORE.	2800 N. W. Nela St.	CApitol 3-2101	C. A. Rost
RICHMOND 19, VA.	1004 No. Thompson St.	6-2385	D. N. Jenks
ROCK ISLAND, ILL.	111 Fourth Ave.	8-3405	R. E. Hixson
ST. LOUIS 1, MO.	710 No. Twelfth Blvd.	CHestnut 1-8920	B. H. Sullivan
SEATTLE 4, WASH.	202 Hoge Bldg.	SEneca 8300	H. E. Bentz
TAMPA 2, FLA.	505 Twiggs St.	2-0115	D. B. Clark

In addition to the Sales District Headquarters cities listed above, G-E Lamp salesmen are resident in 79 other cities. Consult your telephone directory under General Electric Company Lamp Division.

General Offices, Nela Park, Cleveland 12, Ohio

This is a reprint from

LIGHT MAGAZINE

Vol. 25, No. 1 January-February, 1956

LARGE LAMP DEPARTMENT

GENERAL ELECTRIC

NELA PARK CLEVELAND 12, OHIO